

## **Historic, archived document**

Do not assume content reflects current scientific knowledge, policies, or practices.

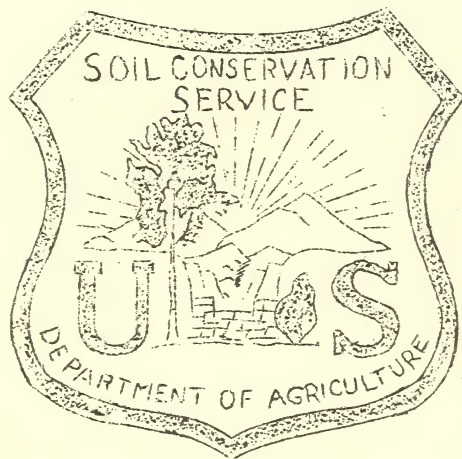


1.96  
503900

LIBRARY  
RECEIVED

★ MAR 2 - 1936  
U. S. Department of Agriculture

# COLORADO CONSERVANCY



PROJECT 01-8  
COLORADO SPRINGS  
COLORADO

FEBRUARY

1936

## MARROW AND GRASS

The recent National Western Stock Show saw crowded pens in the Denver Union Stock Yards. Packed with thousands of fat cattle and sheep. Activated buying that drove a carload a minute under the auctioneer's hammer. Livestock of the West sold to buyers from twenty-nine States, Canada and Mexico. Sales that totaled almost two and one half millions of dollars.

Looking down from the elevated walks of the Yards was a picture, the last in a progression of sequences, of the West's oldest industry. Here was the marrow of the West.

To a thoughtful spectator a question as this might have arisen: "How much Grass was required to raise and produce such fine cattle and sheep?" And a further question: "How many million acres of land to produce this life giving vigor-Grass?"

These questions can not be estimated without intensive surveys and research, but certainly they may be evaluated. Grass is the most valuable of all crops.

The quest for Grass played a major role in the development of the West and today, Grass occupies a still more important place in the continued profitable occupation of Western domain.

Before Grass was starved and turned under, there were no wide spread disasters of dust and flood. Nature's vegetative cover protected and stabilized the soils of the West against erosive action of wind and water.

Again there is a quest for Grass. The permanent protection of the land and a perpetual profit for a great Western industry.

The Editor

VOL. 2

FEBRUARY

NO. 2

Published Monthly by Soil Conservation Service  
Colorado Springs, Colorado

Editor--J. S. Young                      A. E. McClymonds  
State Co-ordinator  
Contributors--Soil Conservation Staff

SO SAYS THE STATE CO-ORDINATOR

HIGHWAY PROTECTION

The methods of soil conservation used on the lands to prevent wind and water erosion have a definite relation to the highways.

The contour-furrowing is designed to keep the water on the land where it falls, thus preventing the formation of gullies which destroy our highways and bridges.

Numerous water conservation dams at the headwaters of an area hold the water and cut down the peak of the floods.

Wherever possible, road gullies should be dammed and the water diverted from the road into a field. These fields must be contour-furrowed or terraced before this practice is safe.

Contour cultivation of the land allows the moisture to go into the ground. Listing up and down the hill simply forms easy courses for the water to follow. Afterwards this water runs off the field into the road, washing out many culverts and bridges.

On the steeper slopes, bridges are built over a certain water course, and at the time of building the piling is deep enough in the ground to support the bridge; but later, after a series of floods, the gully is deepened and eats back into the piling, destroying the foundation of the bridge, or washing out the fill on one side of the bridge.

Damaging floods can be controlled by starting at the top and working down the slopes along the water courses. A three-inch rain is forty acre feet of water on every 160 acres of land. If this water can be held on the ground and let down gradually, it will do no damage. If you multiply these figures by 100, the result is 16,000 acres or 4,000 acre feet of water, and this, with even a 50% run-off, which is conservative, results in a very destructive flood.

The type of contour furrow constructed by the Soil Conservation Service is designed to hold a three-inch rain. This water will have twenty-four hours to penetrate into the ground, and thus gradually seek its level in the regular water channels. After a field has been contour-furrowed, springs that have been inactive for twenty-five years have started running again.

Contour-furrowing is not the only device for getting water into the ground; however, it is the best method on steeper slopes. On the more gentle slopes, water spreading devices will slow up the water and let it penetrate into the soil, where it will furnish moisture to the plant life.

A gentle stream is a beautiful sight; a flood is a dangerous and destructive agent. But to preserve the stream, we must take active and careful measures to hold water where it falls and protect the grasses and soils of the watersheds.

A. E. McClymonds  
State Co-ordinator



## PRECIPITATION-RUNOFF INVESTIGATIONS

Information as to the quantity of surficial runoff, which can be expected to occur following a torrential rain upon a watershed is of prime importance to the conservation engineer, who is called upon to design control structures on the drainage area. Factors that must be considered are: percent of slope, type of soil, topography, density of vegetative cover, ground surface conditions, moisture content of the soil. All of these factors are important, and since it is difficult to determine them individually during natural storms, it is desirable to use some type of controlled application that will accurately simulate field conditions.

The engineering department is using a portable sprinkler system to artificially apply a known intensity of precipitation upon a given area for a specific length of time. The area of the test plot is 10 by 30 feet, and the water and eroded material is collected on baffle plates. The quantity and the rate of application is controlled by a pressure supply tank and control valve. In this way, a storm of any intensity or duration can be created.

A series of tests are to be made upon each of the predominating soil types on the project areas. On each type, several degrees of slope will be used as well as various types of vegetative cover with different densities. Tests will be made on soils with varying degrees of moisture from dry to saturated. Due to the frozen condition of the ground now, only a limited number of tests have been made, but some very interesting data has already been obtained. Certain of these follow:

On a fine, sandy, loam type of grassland soil, sparsely covered with oat stubble, and having a ground surface which was loose and structureless, and having a slope of 6 percent, four inches of precipitation were applied at a constant rate for one hour. Altho the soil was very dry, there was a penetration of only four inches

and the run-off amounted to 65 percent.

On a forest type soil of gravelly sandy loam having a four percent slope and covered with a two inch mat of pine needles, 4.8 inches of water was applied at a constant rate for one hour. 46 percent runoff occurred, with a penetration of seven inches.

Another forest soil of loamy sand and having a similar covering of needles, but having a ten per cent slope was tested by applying 2.8 inches of water at a slower rate for one hour. The run-off was about the same as on the previous forest soil, but the penetration was greater. Altho a constant quantity of water was applied, the runoff was constant for 45 minutes and then gradually decreased. On two places on the plot, the penetration reached 18 inches.

The conclusions to be drawn are that over much of the forest area of the Black Forest, a gray layer occurring just below the surface is somewhat impervious to water when a large quantity is applied for a short duration as would occur during a torrential rain, whereas, if a quantity of water is applied at a slower rate, the impervious layer becomes saturated, and permits deeper penetration with resultant decrease in runoff.

Verne Stambaugh, Asso. Agricultural Engineer.

#### ----SOIL CONSERVATION SERVICE----

#### RODENT CONTROL

The purpose of rodent control is to stop, as much as possible, the crop and soil losses, where rodent infestation is a principle factor. Such control is also very important in grazing areas, particularly those that have suffered from over-grazing. Since we cannot merely order rodents to cease eating and digging, we must, if we are to prevent their depredations, undertake active control measures.



It is a well-known fact that when the white man began his operations in this country, he upset certain of Nature's delicate balances. One of these was the the wholesale destruction of predatory animals such as the coyote and the hawk, which very soon resulted in an abnormal increase in certain harmful animals such as the prairie dog and the gopher, which are their natural food. The introduction of agriculture on lands that were formerly grass also offered these animals a better cover from their natural enemies as well as more abundant food. The result has been that we can no longer depend on natural balances to keep these rodents under control, but must directly attack them by a combination of control methods. This involves the cooperation between all farmers and the technical men in charge of control.

Past records show that the annual cost to the crops of this country due to rodents approximates 150,000,000 dollars each year. In New York state the loss on one orchard due to field mice was ten thousand dollars in one year. In the eastern part of Colorado the loss on the wheat fields due to jack rabbits is estimated as 30 to 40 per cent. We in Colorado cannot afford to raise crops and allow such a large percentage for these pests. The loss on range land due to destruction of grass cover is tremendous. Obviously, we cannot allow this to continue if we are to make our lands profitable. The technical men of the Biological Survey and those attached to the Soil Conservation Service are ready and willing to offer their services at any time to any farmers desiring them.

Lowell Addington, Rodent Control Supervisor

#### ----- SOIL CONSERVATION SERVICE -----

More than 40 percent of the soil wealth is contained in the top six inches of soil.

CAMP SCS-9-C  
Elbert, Colorado

The majority of the work this month consisted of building permanent water-hole and check dams. The rock quarry crew carried on as in the past, furnishing rock to the other projects insofar as it was able. Another rock quarry has been opened up on one of the recently signed up cooperating places.

A decided increase in water-hole dams has been reported this month over last month.

Our new garage and office building have been built and will be ready for occupation the first of February. These two buildings will furnish us with a great deal of much needed space and will enable us to have more room in our living quarters.

A crew has been started in making willow cuttings in preparation for the spring planting. The boys have taken to this type of work very readily and considerable improvement has been noted since they started.

The schools have been continued and are meeting with considerable success. It is planned to start some classes in other subjects later in the spring. There has been a consistent interest in soil conservation work among the enrollees and it is hoped that a full soil conservation educational program may be instituted in the near future with the idea of giving vocational training in this field of work.

R. V. Prink, Superintendent

-----SOIL CONSERVATION SERVICE-----

"Our heritage from Nature--the Good Earth--is a sacred trust, and it is our solemn duty to keep this trust inviolate."

Buffalo Grass (Buchloe dactyloides)

Few of the Great Plains grasses are as well known to stockmen and farmers as is Buffalo grass. It may spread and propagate for many years without producing seed, by the presence of runners or stolons. The runners send out both roots and shoots which in turn send out more runners. The seed habit is weak, and it is not every season that seed is produced. The seed is not always viable when produced, although reproduction by seed may occur.

The flowers are of two kinds, male and female, and may be borne on different plants or as two different offshoots from the same plant. The male flowers (Fig. 2) are borne in small spikes or heads hanging from the side of slender stems ranging from 4 to 8 inches in height. These male spikes resemble somewhat those of Grama grass, though smaller. The female flowers (Fig. 1) are crowded 4 or 5 together, in small heads, the body hard, white, and nearly spherical, with a crown or fringe of upright points. The florets are hidden by the outer glumes, which form the hard covering of the heads. These heads are borne, 1 to 3 together, at the base of lower sheaths and are partly concealed by the narrow, flat, more or less curly leaves. Figure 5 shows a female floret.

Buffalo grass forms a very dense sod and where vigorous and well adapted occurs in an almost pure stand. It grows well on a great variety of moderately moist rich soils. The palatability is very high, and it is grazed with relish by nearly all classes of stock, a condition which, combined with overgrazing of the prairie ranges, is causing the grass to disappear rapidly. It is important only as a forage crop and never grows sufficiently high to be cut for hay. It is hardy and very drought enduring. It is sometimes confused with the Grama grasses.

Vine Mesquite (Panicum obtusum)

Like most of the panic grasses, Vine Mesquite is

Agronomy Division. Important Native Grasses.  
Series 4.

Figure 1. Pistillate spike of  
Buffalo Grass.

Figure 2. Staminate spikelet of  
Buffalo Grass

Figure 3. Floret of Vine-mesquite.

Figure 4. Spikelet of  
Vine-mesquite.

Figure 5. Floret of Buffalo Grass.

Figure 1.

Figure 2.

Figure 3.

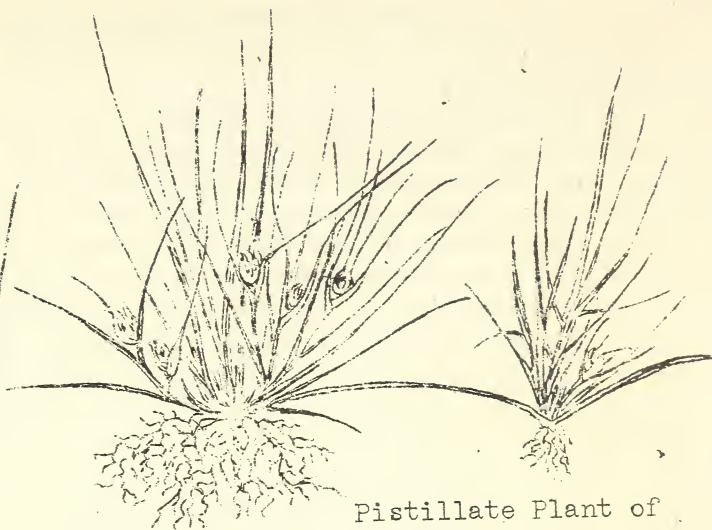
Figure 4.

Vine-mesquite.  
(*Panicum obtusum*).

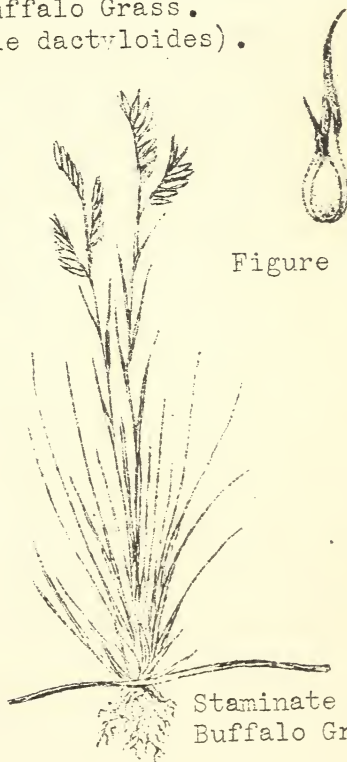




Desert Saltgrass.  
(*Distichlis stricta*).



Pistillate Plant of  
Buffalo Grass.  
(*Buchole dactyloides*).



Staminate plant.  
Buffalo Grass.

Figure 5.

quite highly palatable when young, but tough toward maturity. It is more palatable to horses and cattle than to sheep.

The stems are stiff, erect, 1 to 2 feet high. The stolons are several feet long and are conspicuous for their length and for the swollen wooly joints which have leaves present. The leaves have a bluish cast, are erect, quite long and narrow pointed. The panicles are rather narrow and densely flowered. Vine Mesquite is not abundant in Colorado, and for that reason is not important as a forage plant. It grows mostly along the banks of streams and ditches in sandy and gravelly soil. Figure 3 shows a floret of Vine Mesquite, and figure 4 shows a spikelet.

#### Saltgrass (*Distichlis stricta*)

Saltgrass is commonly found growing throughout the arid West on salty or alkaline soils where the water table is high. Where the moisture and soil conditions are favorable, it grows luxuriantly in a rather dense stand. A high water table is essential, consequently it is found only in depressions where the water accumulates. It is very drought enduring for a season or two, but will die out if the moisture supply is absent for several seasons. In Colorado it is usually short, perennial, with stout rootstocks, and with short compressed panicles one to several inches in length. The leaves are stiff, usually crowded, with overlapping sheaths. At maturity the whole plant takes on a reddish brown cast. Horses and cattle eat it readily, but sheep do not relish it highly. The florets in the spikelets are somewhat compressed and arranged in rows along a short stem. Saltgrass is not an important range plant, due to its restricted growing area and relatively low palatability.

C. W. Frutchey  
Junior Agronomist



The plague of drought has sent stockmen scurrying in all directions in search of forage plants that endure rainless summers, and virtue has been found among many shrubs that have heretofore been passed up as worthless. Browse plants, because of their deep root systems, have withstood the rigors of drought better than native grasses and in many instances saved the stockman's livestock. In many cases a patch of what the stockman believed to be a worthless patch of greasewood, shadscale or yucca, actually pulled him through a dry spell.

Doubtless, the first ranking browse plant of eastern Colorado is variously known as chamiza, white greasewood or saltbrush, and is identified among botanists as *Atriplex canescens*. The plant is at home in the salty calcium soils footing the mountains of Colorado, and reaches out into the plains for some distance as well. It is a freely branching shrub growing to 4 feet high under average range conditions, and achieves such surprising heights as 10 feet under unusually favorable situations. Its importance is ascribed to its wide range of growth; its abundance; accessibility; size; agreeable salty taste; evergreen habit; high percentage of edible parts, leaves, stems, flowers and fruit all being usable; and tremendous root development enabling great tolerance of drought; ability to withstand low temperatures; copious production of fattening, highly palatable seed; and rich food value. Root systems of over 20 feet deep have been reported by several investigators. The shrub thrives under moderate winter grazing or alternate summer and winter grazing.

It is practically unexcelled as a protein-producing shrub, the leaves carrying as high as 18 percent of this desirable constituent; while a composite sample of leaves, stems and fruits show a protein content of about 13 percent. The plant is grazed equally by cattle, sheep and goats. Under certain conditions it has been

known to poison sheep. Salt-hungry sheep are unduly attracted to it, and after a hearty drink have been known to die from its effect. However, where sheep are properly salted and not forced to eat chamiza as their sole diet, only favorable results are known. During the growing season, stock prefer grass and weeds to chamiza, if they are available, and under a proper grazing set-up this feature automatically cares for itself as the weeds and grass are eaten when they are more edible, leaving the chamiza to mature for winter use when a succulent salty feed of its type is relished.

Native forage plants generally do not produce any appreciable quantity of viable seed and reproduction is slow because the seedlings do not compete well with weeds when grazed by stock. Contrarily, chamiza produces an abundance of seed that germinates very well in a cold seed bed. Under moderate protection, the seedlings produce seed in two years and develop root systems of unbelievable depths in this time. Stockmen wishing to improve the carrying capacity of their pastures can give chamiza consideration if their soils warrant its production.

B. W. Allred  
Assistant Range Examiner

### SOIL CONSERVATION DAY

At the annual Colorado Pure Seed Show held in the Colorado Springs City Auditorium, February 3 - 8, one whole day, February 6th, was set aside as Soil Conservation Day. The morning was devoted to talks and discussions, conducted by State Co-ordinator McClymonds and the departmental chiefs. The afternoon was given over to a tour of the Cherry Creek, Black Squirrel and Templeton Gap areas. A loudspeaker system was carried on the tour, making explanations of the work audible to everyone. Keen interest was shown in both the meeting and tour, approximately 200 people attending.

Shelterbelts of trees may be so planted as to serve several purposes. The farmstead, or ranch home, can be made much more comfortable and inviting by such a planting to check the wind during winter and summer. How much more pleasant it would have been during the blizzard of February 7th if there had been a good belt of pine on the north side of the buildings. You would have been warm and it would not have required so much feed for the stock.

Also, shelterbelts around cultivated fields and strips through the fields across the prevailing winds will do much to reduce the loss of moisture caused by wind. Those snow drifts that pile up around the buildings indicate what a shelterbelt will do around the field.

Then, there is the pasture shelterbelt. Did you ever find any dead cattle piled up in the southeast corner of a pasture fence after the blizzard? Did you ever spend days or weeks hunting for stock that drifted out with a storm, along about this time of the year? Some people have, because you will find numerous board shelters put up in winter pastures all over the eastern part of Colorado. A good belt of trees is better than a board shelter and will save many cattle and many days of hunting stray stock.

Quite a bit of work is necessary to get trees to grow in the prairies. Nature won't do it alone. First, the area planted to trees must be fenced, because you can't raise trees and cows on the same land. Second, the plot must be cultivated because Old Dame Nature would cover all the prairies with sod if you left it to her. Third, it is a good idea to put in a short ditch so as to bring some extra water into the area when the trees are planted.

For best results the shelterbelt should be planted so that it can be cultivated on a contour. Cultivation keeps the grass and weeds out so the trees will profit by all the moisture in the ground. You would not raise much

corn if you didn't cultivate it, simply because Mother Nature did not intend that corn should grow in this country. Mother Nature is a hard master, and yet if you will help her, she will do lots of things for you that she can't do alone. She will even make trees grow if you give her a little help.

Contour cultivation holds all the moisture that falls on the ground. If there is a grass area above it, the water that runs off the sod will collect in the shelter-belt and do a lot to help the trees grow.

If rabbits are plentiful, it is advisable to put a rabbit-proof fence around the area to be planted to trees. After about ten years, the trees will be large enough so the rabbits won't bother them. While the trees are small, the rabbits take to them as a boy takes to apple pie.

Of course, pine trees grow slowly, but they grow more rapidly on the plains than they do in the mountains. The altitude is lower and the growing season is longer. At Akron, Colorado, there is a shelterbelt of pine twenty-four years old and over twenty feet high. These pines are healthier and taller than ash, elm, hackberry, honey-locust and Russian olive, all planted the same time. It is a good plan to plant a row or two of Chinese elm or other fast growing tree along with three rows of pine. By the time the elm are gasping for breath, the pines will be large enough to afford some real protection.

Professor Ford, your State Extension Forester at Fort Collins, has a bulletin, "Tree Windbreaks for Colorado", that contains much valuable information. If you are interested, write him or the Soil Conservation Service in Colorado Springs.

H. D. Petheram  
Forester



CAN THE SOIL CONSERVATION SERVICE  
HELP BRING BACK OUR SMALL GAME?

15

During duck season last fall, we noticed many flocks of ducks and geese fly over. Only a few lighted in this St. Charles basin. The reason? Scarcity of water conservation. However, by next fall we expect to have not less than 25 dams which will give us about 10 acres of water surface for the fowls to light on. By planting wild rice, establishing various species of algae and other aquatic plants in these ponds, there is no doubt that our waterfowl increase will be excellent.

Quail season has been closed about 20 years, and, according to observations noted by the technical staff, very few covies have been seen in this area. Therefore, it is logical to conclude that either various people have disregarded state game laws, or the food for quail is lacking. By planting various shrubs and trees in this area, there is little doubt that the added fruit, shade and cover will tend, in a few years, to provide the extra ingredients needed to give the quail the advantages that have been taken away from them by man.

Dove season has been closed about eight years. The same reason prevails as with quail. But there is another consideration; doves, it has been noted, do not linger as long as they did a few years back. As soon as the young are able to fly they leave, and the reason is that grass, because of overgrazing, has not been permitted to develop a seed crop necessary to the birds. Also, the precipitation that falls has been allowed to run off the hillsides, which action aids in the destruction of grass cover. But, with contour furrowing, this moisture is going to be held and help bring back this grass. With a restricted and controlled grazing program, as advocated by the Soil Conservation Service, grass is going to seed, and this will tend to hold the doves in the area.

Out cotton-tails too have fallen off in number, the main reason being the lack of cover and the distance to water. With the establishment of dams, and the planting

16 of trees and shrubs, our long-legged friends will increase. It has been suggested that we try to introduce pheasants, but it is our opinion that this section has not enough cereal grain to hold them or warrant their introduction.

It would seem feasible to bring in several pairs of prairie chickens or grouse, and turn them loose in the area when vegetative cover has been established and a good tree stand planted. As favorable conditions develop, other species of wild-life might well be introduced. But we can say this now: the work of the Soil Conservation Service in the St. Charles Basin will be of more than passing benefit to the sportsmen of a few years hence by establishing for them a Happy Hunting Ground.

Lamar Price, Camp SCS-2-C, Boulah, Colo.

NOTE:

At first thought, Soil Conservation and the conservation of Wild-Life appear totally unrelated, but as Foreman Price indicated in the above article, there is a definite relationship.

For the benefit of land-owners and farmers interested in game conservation it may be interesting to know that the Soil Conservation Service is definitely committed to a program of game conservation. In three states in the upper Mississippi valley, over 800 acres of gully planting was designed so that it would afford cover, lanes of crossing, and food for game birds and small game animals. In Colorado, 156,000 acres purchased by the Resettlement Administration which will be treated by soil conservation methods will be so treated that there will be on the area a haven for both water fowl and ground birds, as well as beneficial small game animals.

Restoration of a heavy stand of grasses, and the planting of trees and shrubs that give both cover and food to wild life is a program that fits in naturally with the principle aim of the Soil Conservation Service, that of checking soil erosion.



## EXHIBITS

The Soil Conservation Service sponsored several exhibits during the month of January. The first was shown at the National Western Stock Show in Denver, January 18 - 25. The exhibit consisted of a model farm constructed to scale and enclosed by a glass case. A realistic dust storm was created by utilizing two vacuum cleaners to draw dust across the farm. Pictures of erosion conditions were shown in conjunction with the model and 4,000 pamphlets of factual information were given out. An estimated 15,000 people viewed the demonstration.

On January 23rd and 24th at the state meeting of the Izaak Walton League in Colorado Springs four models were shown. These models are of permanent construction, built to scale, and depict erosion problems common to this region. 120 people were in attendance. This same exhibit was featured at the Lamar Stock Show in Lamar, Colorado, January 28 - 31 with an approximate attendance of 1,000 people.

The departments of Soils, Forestry, Agronomy and Education and Information cooperated in building a display at the annual Colorado Pure Seed Show in Colorado Springs, February 3 - 8. This exhibit was one of the most elaborate to date, consisting of maps, soil samples, seed samples, herbariums, a seeded contour furrow and appropriate pictures. An estimated 3,000 people attended this show.

The above exhibits were all shown under the direction of the department of Education and Information.

UNITED STATES

PENALTY FOR PRIVATE USE TO AVOID

DEPARTMENT OF AGRICULTURE

PAYMENT OF POSTAGE \$300.

SOIL CONSERVATION SERVICE

COLORADO SPRINGS, COLORADO

OFFICIAL BUSINESS

MISS C. R. BARNETT  
LIBRARIAN  
DEPT. OF AGRICULTURE  
WASHINGTON, D. C.

*3 copies*